SECTION 607
FENCES

607.01 DESCRIPTION. This work is constructing, removing and resetting barbed wire, combination barbed and woven wire, chain link fences and gates.

607.02 MATERIALS. Furnish materials meeting the following requirements:

Chain Link Fence	Subsection 712.01
Interstate and Farm Fence	Subsection 712.02
Class "F" Portland Cement Concrete	Section 551

Fence material acceptance test samples will be taken from the materials delivered to the project.

607.03 CONSTRUCTION REQUIREMENTS.

607.03.1 General Requirements. Construct fencing before any other work is performed on all parcels of land. This requirement may be waived where the Contractor has obtained a landowner written waiver. The waiver must state a completion date agreed to by the Landowner and Contractor for completing the fence work.

Maintain all existing fence enclosures. Close Contractor fence openings using new permanent fence, or use temporary fence, cattleguards, or watchman where new permanent fence cannot be constructed the same day.

Temporary fence may be used in place of new permanent fence if approved.

607.03.2 Clearing and Leveling Fence Lines. Keep clearing and leveling outside the fence line to a minimum.

Remove and dispose of trees, shrubs, brush, rocks, and other obstacles that interfere with the fence construction under Section 201. Contour the ground at the fence line to permit fence construction.

607.03.3 Constructing Chain Link Fence. Construct chain link fence as specified in the Contract and meeting the following requirements:

A. Posts. Set posts vertically, spaced at maximum 10 foot (3 m) centers, measured parallel to the ground surface.

Set posts for 5 and 6 foot (1.5 m and 1.8 m) fence in concrete. Set end, corner, and pull posts for 3 and 4 foot (0.9 m and 1.2 m) fence and line posts connected by bracing to end, corner, or pull posts in concrete. Drive or set in concrete, line posts on 3 and 4 foot (0.9 m and 1.2 m) fence as specified.

Use the footing dimensions and post embedment depths shown in the Detailed Drawings. Crown concrete footings to shed water.

Do not damage posts while driving them. Backfill and compact the voids around posts.

Set line posts placed in solid rock without soil overburden, at least 14-inches (360 mm) deep. When in solid rock, set end, corner, gate, and pull

posts at least 20-inches (510 mm) deep. Excavate or drill holes to a minimum width or diameter 1-inch (25 mm) greater than the largest dimension of the post being set.

Cut posts to the required length before installing. The Contractor may use an even post length set deeper into the solid rock at Contractor expense.

For metal posts placed in bored rock holes or consolidated soils, set the post plumb and fill the holes with grout that is one part portland cement and three parts clean, uniformly graded sand. Work the grout into the holes to eliminate voids. Concrete footings are not required where posts are set in bored holes.

Place posts, set in solid rock covered by soil or loose rock, to the specified depths or to the minimum solid rock depths specified above, whichever is less. When solid rock is encountered before reaching the specified depth, construct concrete footings from the solid rock to the top of the ground on 5 and 6 foot (1.5 and 1.8 m) fence and on end, corner, and pull posts for 3 and 4 foot (0.9 and 1.2 m) fence. Grout around that part of the post that is in solid rock.

Assure all posts are solid once they are driven, backfilled or concrete is placed.

B. Top Rail or Cable. Pass the top rails through the line post tops, providing a continuous brace from end-to-end of each fence section. Join top rail sections using sleeve-type couplings. Fasten the top rails to the terminal posts using pressed steel fittings.

Replace the top rails with a 3/8-inch (9.5 mm) diameter galvanized steel cable when fences are placed within 50 feet (15.2 m) from the edge of the nearest driving lane.

C. Fence Fabric. Place chain link fabric for 6 foot (1.8 m) fence on tangents, on the post face away from the highway. On 3 , 4 , and 5 foot (0.9, 1.2, and 1.5 m) fence, place the fabric as directed. On curves, place the fabric for all fence heights on the outside face of the posts on curves.

Place the chain link fabric on a straight grade between posts, leveling high points on the ground. Obtain the Project Manager's approval to fill in depressions along the fence line.

Stretch taut and securely fasten the fabric to the posts. Stretching by motor vehicle is prohibited. Use stretcher bars and fabric bands spaced at 1 foot intervals (305 mm) to fasten to end, gate, corner, and pull posts. Cut the fabric and attach each span independently at all pull and corner posts. Fasten fabric to line posts at 14-inch (360 mm) intervals with tie wire, metal bands, or other approved fasteners. Fasten the top edge of the fabric to the top rail or cable with tie wires spaced at 18-inch (460 mm) intervals.

Join rolls of wire fabric by weaving a single strand into the ends of the rolls forming a continuous mesh.

When a winged cattle guard is located in a chain link fence, extend the wire fabric beyond the post supporting the wing and securely fasten it to the wing.

D. **Tension Wire.** Attach a tension wire to the bottom of the chain link fabric using ring fasteners at 24-inch (610 mm) maximum intervals and secure at the terminal posts or pull posts using brace bands.

E. **Gates.** Fasten chain link fabric to the gate frame end bars using stretcher bars and fabric bands, and to the top and bottom of gate frame bars using tie wires for the chain link fence, or by other approved standard methods.

Clean welded connections on steel gate frames with burned spelter coating by wire brushing, to remove all traces of the welding flux and loose or cracked spelter. Paint the cleaned areas with two coats of zinc oxide-zinc dust paint mixed in a weight ratio of one part zinc oxide to four parts zinc dust.

Provide the drop-bar locking device for double metal gates with a 12-inch (305 mm) square by 15-inch (380 mm) deep Class "F" concrete footing crowned at the top. Provide a minimum 6-inch (155 mm) hole in the footing to receive the locking bar.

F. **Panels.** Install panels as shown in the Detailed Drawings.

Double panels at fence corners and angle points consist of one corner post, two line posts, two braces, two truss rods, two top rails, concrete, and other fixtures. Single panels at gates and fence ends consist of one gate or end post, one line post, one brace, one truss rod, one top rail, concrete, and associated fixtures.

607.03.4 Constructing Barbed and Woven Wire Fences. Construct barbed and woven wire farm and interstate fences meeting the Contract requirements and the following.

A. **Posts and Braces.** Excavate post holes, footing excavations, and anchors as shown in the Detailed Drawings.

Wood posts may be driven. Repair or replace all damaged posts at Contractor expense.

Treat cut or trimmed areas on posts and braces with three applications of a copper naphthenate solution containing a minimum of 2 percent copper metal or with chromated copper arsenate (CCA) meeting AWPA M4 requirements.

Securely nail braces to terminal and brace posts.

Metal posts not specified to be set in concrete may be driven. Place and grout metal posts placed in rock as specified.

Backfill and compact post hole material in 6-inch (155 mm) loose lifts.

Dampen holes before placing concrete. Assure the concrete has set before placing and stretching the fence wire or attaching gates to the posts and braces.

B. **Placing Wire.** After the posts, braces, and footings are set, place the woven wire and/or barbed wire, stretch it tightly, and fasten to the posts.

Apply tension following the wire manufacturer's recommendations with a mechanical or other approved wire stretcher. Do not use motor vehicles to stretch fence.

Diagonally drive U-shaped staples across the wood grain so both points enter different grains. Where wire uplift occurs, drive staples with the points slightly upward. On level ground and over knolls, drive staples slightly

downward. Staple the wire tightly at corner, end, and pull posts. The staples on line posts must allow wire movement without damaging the wire.

Place "Deadman" as shown in the Detailed Drawings at grade depressions, alignment angles, and other places where stresses might pull posts from the ground or out of alignment.

Install one metal line post in each 500 foot (152.5 m) wood post fence run and in smaller runs between gate post ends for lightening protection.

Construct gates as shown in the Detailed Drawings meeting Subsection 712.02 requirements.

607.03.5 Temporary Fence. Erect temporary fence to keep livestock and traffic out of the work area. Temporary fence may remain in place only during the work or until the fence is directed to be removed.

Use Type F3M as temporary fence for livestock enclosures. Construct all temporary fence from metal posts and materials meeting Section 712. Use the minimum number of braces, panels, deadman, and other accessories for constructing temporary fence.

Undamaged material used in the temporary fence that meets specifications may be used in the permanent fence. Material not used in permanent fencing remains the Contractor's property.

Remove temporary fence at Contractor expense.

607.03.6 Remove and Reset Fence. When removing and resetting a fence, furnish all required materials over and above the usable salvaged fence that are new materials meeting Section 712 requirements. Required new materials are listed in the Contract. Use, to the extent practical, materials of the same type and quality as those of the old fence that meet of Section 712 requirements.

Replace rotten, damaged, or broken posts and rusty, unusable wire with new material. Do not use any galvanized materials with abraded or broken coating.

Furnish all additional fence wire required for depressions.

Carefully handle and stockpile, at designated locations, all removed fence determined to be salvageable.

607.04 METHOD OF MEASUREMENT.

607.04.1 New Fence. Chain link fence is measured by the linear foot (meter) to the nearest foot (0.1 m). Interstate, farm, and temporary fence is measured by the linear foot (meter) and converted to rods (meter) to the nearest 0.1 rod (0.1 m). The measurements are made on the fence line along the top wire or rail or along a line parallel thereto, from end post to end post including wing fences to structures. Gates, cattle guards, or other openings are measured separately. Double sections of fence erected across depressions are measured for payment. All other temporary closures are included in the measurement of temporary fence. Temporary fence materials ordered by the Contractor but not used in the work will not be measured or paid for. Temporary fence removal is not measured separately.

607.04.2 Remove and Reset Fence. Remove and reset chain link fence is measured by the linear foot (meter). Remove and reset fence (interstate and farm)

is measured by the linear foot (meter) and converted to rods (meter) to the nearest 0.1 rod (0.1 m). Measurement of re-set fence in place is made under Subsection 607.04.1.

New posts and wire required to reset the removed fence is measured as follows:

1. Wood and metal posts are measured by the unit.
2. Barbed wire is measured by the spool. A spool contains 80 rods (402.6 m) of wire.
3. Woven wire is measured by the roll. A roll contains 20 rods (100.6 m) of woven wire.

The post and wire quantity specified in the contract is an estimate only. The actual quantity required to complete the work will be paid for at the contract unit price bid.

Panels required for remove and reset fence are not measured for payment.

607.04.3 Gates. Gates are measured by the linear foot (meter) between gate posts.

607.04.4 Fence Panels. Single and double fence panels are measured by the unit.

607.04.5 Deadman. Deadman are measured by the unit. Anchors are not measured for payment.

607.04.6 Dozer Operation. Dozer operation is measured by the hour under Subsection 210.04.1. When dozer operation is not a bid item, it is incidental to and included in other fencing items.

607.04.7 Remove Fence. Remove chain link fence is measured by the linear foot (meter). Remove fence (interstate and farm) is measured by the linear foot (meter) in place before removal along the top wire, or on a line parallel thereto, exclusive of gates, cattle guards, and other openings, and converted to rods (meter) to the nearest 0.1 rod (0.1 m).

607.05 BASIS OF PAYMENT. Payment for the completed and accepted quantities is made under the following:

Pay Item	Pay Unit
New Fence Chain Link	Linear Foot (meter)
Interstate, Farm & Temp.	Linear Rod (meter)
Remove and Reset Fence Chain Link	Linear Foot (meter)
Interstate and Farm	Linear Rod (meter)
New wood or metal posts	Each
Barb Wire	Spool
Woven Wire	Roll
Gates	Linear Foot (meter)
Fence Panels	Each
Deadman	Each
Dozer Operation	Hour (see subsection 210.05)
Remove Fence	Linear Foot (meter)

The cost of removing existing fence is included in the cost of the new fence.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the Contract.